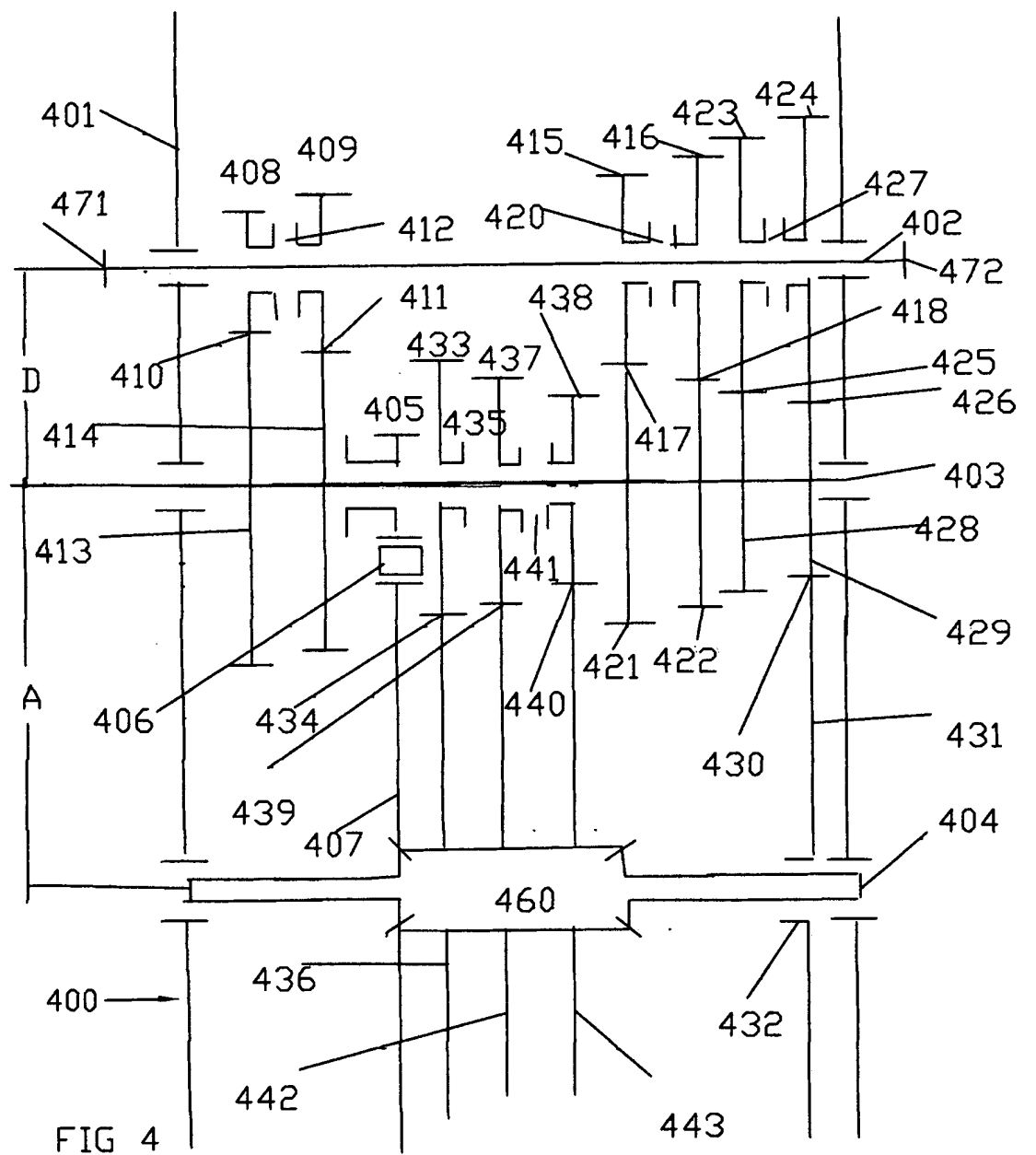


FIG. 3



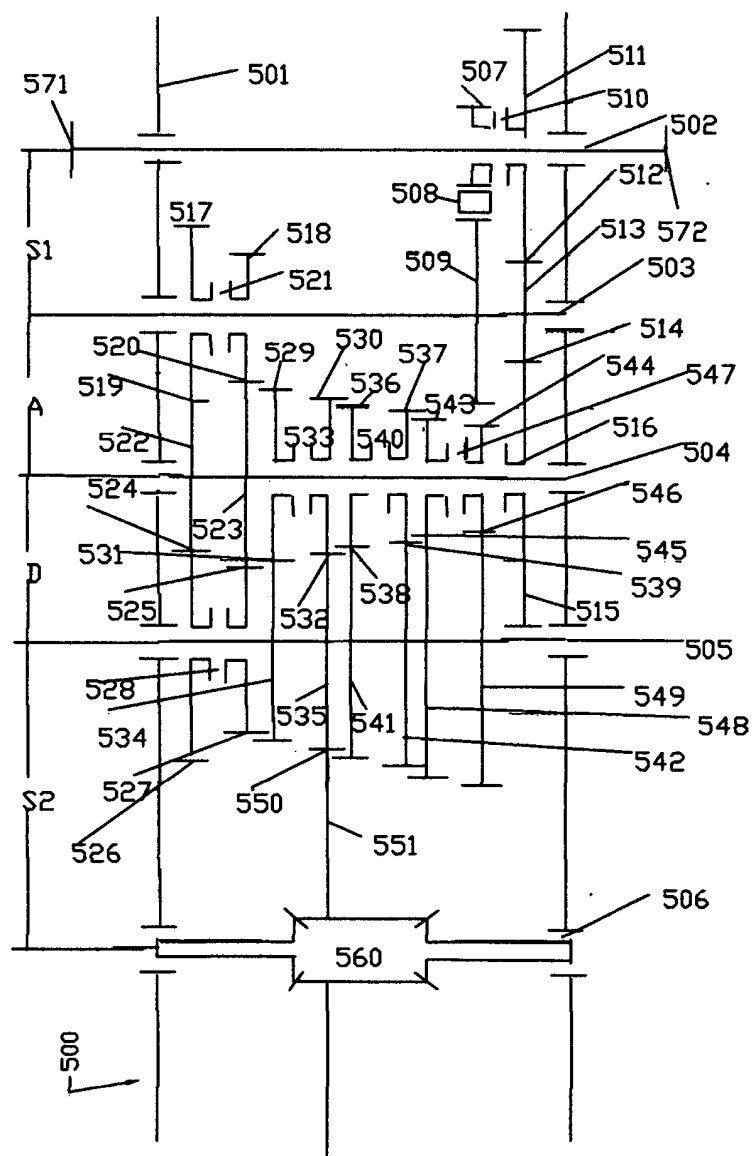


FIG. 5

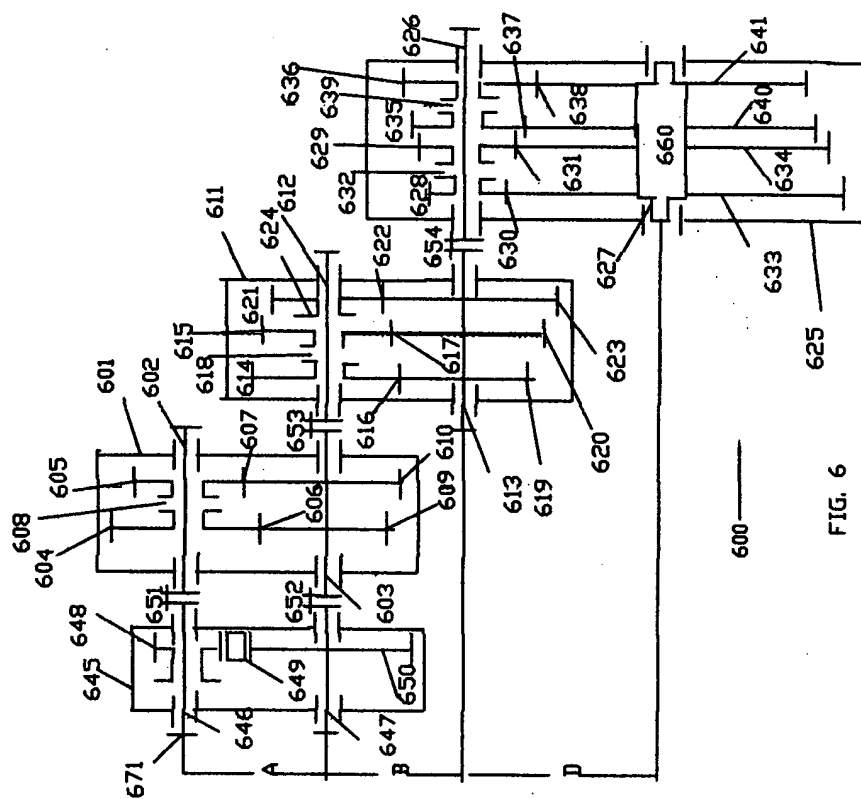


FIG. 6

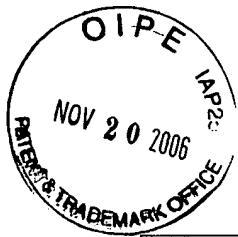


FIG. 1A
COMBINATIONS OF ENGAGABLE PINIONS

FORWARD TORQUES	2 PINIONS GROUP C	3 PINIONS GROUP D	2 PINIONS GROUP B	2 PINIONS GROUP A	REVERSE TORQUES	PINION
1	111	115	133	129	1	107
2	111	122	133	129	2	107
3	111	116	133	129	3	107
4	111	115	125	129		
5	111	122	125	129		
6	111	116	125	129		
7	111	115	133	136	4	107
8	111	122	133	136	5	107
9	111	116	133	136	6	107
10	111	115	125	136		
11	111	122	125	136		
12	111	116	125	136		
13	110	115	133	129	7	107
14	110	122	133	129	8	107
15	110	116	133	129	9	107
16	110	115	125	129		
17	110	122	125	129		
18	110	116	125	129		
19	110	115	133	136	10	107
20	110	122	133	136	11	107
21	110	116	133	136	12	107
22	110	115	125	136		
23	110	122	125	136		
24	110	116	125	136		

FIG. 1B
FOUR GROUPS OF NINE GEARSETS WITH DEFINITE RATIOS

GROUP A 2 GEARSETS #/RATIO	GROUP B 2 GEARSETS #/RATIO	GROUP C 2 GEARSETS #/RATIO	GROUP D 3 GEARSETS #/RATIO
137 / 1	134 / $1/R^2$	112 / 1	118 / R^2
130 / $1/R^{12}$	126 / $1/R^8$	113 / $1/R^3$	123 / R
			117 / 1

FIG. 2A
COMBINATIONS OF ENGAGABLE PINIONS

FORWARD TORQUES	3 PINIONS GROUP B	4 PINIONS GROUP D	2 PINIONS GROUP A	1 PINION GROUP S	REVERSE TORQUES	PINION
1	233	229	214	210	1	207
2	233	224	214	210	2	207
3	233	219	214	210	3	207
4	233	228	214	210	4	207
5	234	229	214	210	5	207
6	234	224	214	210	6	207
7	234	219	214	210	7	207
8	234	228	214	210	8	207
9	240	229	214	210	9	207
10	240	224	214	210	10	207
11	240	219	214	210	11	207
12	240	228	214	210	12	207
13	233	229	215	210	13	207
14	233	224	215	210	14	207
15	233	219	215	210	15	207
16	233	228	215	210	16	207
17	234	229	215	210	17	207
18	234	224	215	210	18	207
19	234	219	215	210	19	207
20	234	228	215	210	20	207
21	240	229	215	210	21	207
22	240	224	215	210	22	207
23	240	219	215	210	23	207
24	240	228	215	210	24	207

FIG. 2B
FOUR GROUPS OF TEN GEARSETS WITH DEFINITE RATIOS

GROUP A 2 GEARSETS #/RATIO	GROUP B 3 GEARSETS #/RATIO	GROUP D 4 GEARSETS #/RATIO	GROUP S 1 GEARSET #/RATIO
217 / 1	241 / 1	230 / R ⁸	211 / 1/R ⁸
216 / 1/R ¹²	236 / 1/R ⁴	231 / R ⁵	
	235 / 1/R ⁸	225 / R ⁶	
		221 / R ⁷	

FIG. 2C
COMBINATIONS OF ENGAGABLE PINIONS
AFTER JOIN TWO SPLIT SHAFTS

FORWARD TORQUES	3 PINIONS GROUP B	4 PINIONS GROUP D
25	233	220
26	233	226
27	233	227
28	233	219
29	234	220
30	234	226
31	234	227
32	234	219
33	240	220
34	240	226
35	240	227
36	240	219

FIG. 2D
TWO GROUPS OF SEVEN GEARSETS
WITH DEFINITE RATIOS

GROUP B 3 GEARSETS GEARSET#/ RATIO	GROUP D 4 GEARSETS GEARSET#/ RATIO
241/1	230/ R ⁸
236/ 1/R ⁴	231/ R ⁵
230/ 1/R ⁸	225/ R ⁶
	221/ R ⁷

FIG. 2E
COMBINATIONS OF ENGAGABLE PINIONS FOR
WORKING ORGAN

FORWARD TORQUES	1 PINION GROUP S	2 PINIONS GROUP B	REVERSE TORQUES	PINION
1	210	214	1	207
2	210	215	2	207

FIG. 2F
TWO UNITS WITH SPLIT
SHAFT ENGAGED

GROUP A 2 GEARSETS #/RATIO	GROUP S 1 GEARSETS #/RATIO
217/1	211/ 1/R ⁸
216/1/R ¹²	

FIG. 2.1A
DRIVE OPPOSITE SHAFT WITH COMBINATIONS
OF ENGAGABLE PINIONS

FORWARD TORQUES	3 PINIONS GROUP B	4 PINIONS GROUP D
1	233	220
2	233	226
3	233	227
4	233	219
5	234	220
6	234	226
7	234	227
8	234	219
9	240	220
10	240	226
11	240	227
12	240	219

FIG.2.1B
RATIOS FOR GEARSETS SHOWN

GROUP B 3 GEARSETS #/RATIO	GROUP D 4 GEARSETS #/RATIO
241/1	230/ R ⁸
236/ 1/R ⁴	231/ R ⁵
230/ 1/R ⁸	225/ R ⁶
	221/ R ⁷

FIG. 2.1E
DRIVE OPPOSITE SHAFT WITH COMBINATIONS OF
ENGAGABLE PINIONS FOR WORKING ORGAN

FORWARD TORQUES	2 PINION GROUP A1	2 PINIONS GROUP S1	REVERSE TORQUES	PINION
1	220	210	1	207
2	219	210	2	207

FIG 2.1F
TWO UNITS IF FIRST SPLIT SHAFT
JOIN TO WORKING ORGAN

GROUP A1 2 GEARSETS #/RATIO	GROUP S1 1 GEARSETS #/RATIO
219/1	213/ R ⁸
220/R ¹²	

FIG. 3A
COMBINATIONS OF ENGAGABLE PINIONS

FORWARD TORQUES	2 PINIONS GROUP B	6 PINIONS GROUP D	2 PINIONS GROUP A	REVERSE TORQUES	PINION
1	310	314	338	1	306
2	310	329	338	2	306
3	310	328	338	3	306
4	310	322	338	4	306
5	310	321	338	5	306
6	310	315	338	6	306
7	310	314	334		
8	310	329	334		
9	310	328	334		
10	310	322	334		
11	310	321	334		
12	310	315	334		
13	311	314	338	7	306
14	311	329	338	8	306
15	311	328	338	9	306
16	311	322	338	10	306
17	311	321	338	11	306
18	311	315	338	12	306
19	311	314	334		
20	311	329	334		
21	311	328	334		
22	311	322	334		
23	311	321	334		
24	311	315	334		

FIG. 3B
THREE GROUPS OF TEN GEARSETS
WITH DEFINITE RATIOS

GROUP A 2 GEARSETS #/RATIO	GROUP B 2 GEARSETS #/RATIO	GROUP D 6 GEARSETS #/RATIO
335 / 1/R ⁵	311 / 1	317 / R ⁵
339 / 1/R ¹⁷	312 / 1/R ⁶	323 / R ⁴
		324 / R ³
		330 / R ²
		331 / R
		316 / 1

FIG. 4A
COMBINATIONS OF ENGAGABLE PINIONS

FORWARD TORQUES	6 PINIONS GROUP D	4 PINIONS GROUP A	REVERSE TORQUES	PINION
1	408	438	1	405
2	409	438		
3	415	438		
4	416	438		
5	423	438	2	405
6	424	438		
7	408	437		
8	409	437		
9	415	437	3	405
10	416	437		
11	423	437		
12	424	437		
13	408	433	4	405
14	409	433		
15	415	433		
16	416	433		
17	423	433	5	405
18	424	433		
19	408	429		
20	409	429		
21	415	429	6	405
22	416	429		
23	423	429		
24	424	429		

FIG. 4B
TWO GROUPS OF TEN GEARSETS
WITH DEFINITE RATIOS

GROUP A 4 GEARSETS #/RATIO	GROUP D 6 GEARSETS #/RATIO
430 / R ⁶	426 / 1/R ⁶
434 / 1	425 / 1/R ⁷
439 / 1/R ⁶	418 / 1 /R ⁸
440 / 1/R ¹²	417 /1/R ⁹
	411 / 1/R ¹⁰
	410 /1/R ¹¹

FIG. 5A
COMBINATIONS OF ENGAGABLE PINIONS

FORWARD TORQUES	1 PINION GROUP S1	8 PINIONS GROUP D	3 PINIONS GROUP A	1 PINION GROUP S2	REVERSE TORQUES	PINION
1	511	522	513	535	1	507
2	511	544	513	535	2	507
3	511	543	513	535	3	507
4	511	537	513	535	4	507
5	511	536	513	535	5	507
6	511	530	513	535	6	507
7	511	529	513	535	7	507
8	511	523	513	535	8	507
9	511	522	518	535	9	507
10	511	544	518	535	10	507
11	511	543	518	535	11	507
12	511	537	518	535	12	507
13	511	536	518	535	13	507
14	511	530	518	535	14	507
15	511	529	518	535	15	507
16	511	523	518	535	16	507
17	511	522	517	535	17	507
18	511	544	517	535	18	507
19	511	543	517	535	19	507
20	511	537	517	535	20	507
21	511	536	517	535	21	507
22	511	530	517	535	22	507
23	511	529	517	535	23	507
24	511	523	517	535	24	507

FIG. 5B
FOUR GROUPS OF THIRTEEN GEARSETS WITH
DEFINITE RATIOS

GROUP S1 1 GEARSET #/RATIO	GROUP A 3 GEARSETS #/RATIO	GROUP D 8 GEARSETS #/RATIO	GROUP S2 1 GEARSET #/RATIO
512 / R ³	519 / R ⁸	525 / 1/R	550 / 1/R ¹⁰
	520 / 1	531 / 1/R ²	
	514 / 1/R ⁸	532 / 1/R ³	
		538 / 1/R ⁴	
		539 / 1/R ⁵	
		545 / 1/R ⁶	
		546 / 1/R ⁷	
		524 / 1/R ⁸	

FIG. 6A
COMBINATIONS OF ENGAGABLE PINIONS

FORWARD TORQUES	2 PINIONS GROUP A	3 PINIONS GROUP B	4 PINIONS GROUP D	REVERSE TORQUES	PINION
1	605	621	628	1	648
2	605	621	629	2	648
3	605	621	635	3	648
4	605	621	636	4	648
5	605	615	628	5	648
6	605	615	629	6	648
7	605	615	635		
8	605	615	636		
9	605	614	628		
10	605	614	629		
11	605	614	635		
12	605	614	636		
13	604	621	628	7	648
14	604	621	629	8	648
15	604	621	635	9	648
16	604	621	636	10	648
17	604	615	628	11	648
18	604	615	629	12	648
19	604	615	635		
20	604	615	636		
21	604	614	628		
22	604	614	629		
23	604	614	635		
24	604	614	636		

FIG. 6B
THREE GROUPS OF TEN GEARSETS WITH
DEFINITE RATIOS

GROUP A 2 GEARSETS #/RATIO	GROUP B 3 GEARSETS #/RATIO	GROUP D 4 GEARSETS #/RATIO
606 / R^6	616 / 1	638 / $1/R^6$
607 / $1/R^6$	617 / $1/R^4$	637 / $1/R^7$
	622 / $1/R^8$	631 / $1/R^8$
		630 / $1/R^9$